

AbstractID: 1695 Title: Robots in patient positioning for external radiotherapy

We describe 4 patient positioners developed and used in our institutions for precise patient set-up in external radiotherapy based on robotics concepts. These include a 4 legged couch, a parallel hexapode chair, an industrial articulated robot and a serial 6 axis couch, all prototypes. A stereotactic rotating couch for proton radiosurgery is presented as an alternative for specific targets, with the advantage of having mechanical isocentric rotations instead of robotic compound movements. These systems have been applied to protontherapy of specific targets (eye tumors, radiosurgery or fractionated stereotactic treatment of intracranial targets, base of the skull and head and neck tumors) with fixed beam lines, two have been conceived and used to treat any region of the body with fixed or isocentric devices of any kind of beam, with patients in prone or supine positions. All systems have 6 degrees of freedom, sub-millimeter accuracy and extended functionality compared to conventional linac couches. Additional features include compensation of systematic errors and deformations, a pneumatic coupler to easily change couch, chair or other devices, and miscellaneous dynamic capabilities. Safety issues have been considered through additional detectors, hardwired interlocks and software limits. We have treated more than 5000 patients with these devices in our institutions, including pediatrics with or without general anesthesia, and elderly patients. The use of robotic concepts for patient positioning can be applied to conventional and extended field treatments, IMRT, IGRT, radiosurgery and hadrontherapy.